

groups he regards as analogous to the Macrura, and the latter to the Brachyura, whilst the Læmodipoda of Latreille are treated as aberrant Amphipods parallel to the *Squilla* amongst the Podophthalma.

In the introductory description of the general characters of Amphipods, our authors give an explanation of the somewhat cumbrous terminology proposed by Mr. Spence Bate for these animals. We cannot but regard it as a drawback upon the efforts of our living zoologists that scarcely one of them produces a work at all monographic in its nature without the introduction of a host of new terms, which, although they may to a certain extent conduce both to accuracy of language and brevity of description, are still so many obstacles to be got over by the student before he can really make use of the aid afforded him. This, however, is but a minor point; and we gladly pass to the consideration of those characteristics of the book which call for unqualified approval. These consist, on the one hand, in the fulness of the synonymy, the clearness with which the characters and descriptions have been drawn up, and the care with which the British localities for each species are brought together; and on the other, in the admirably executed figures with which Professor Westwood has illustrated the species. The latter consist of finished outlines of the animals, accompanied by numerous magnified figures of characteristic details; and although from their nature necessarily inferior in elegance to many of the woodcuts with which we are familiar in Mr. Van Voorst's publications, they will be found of equal or perhaps greater scientific value. The tail-pieces appended to several of the articles fully maintain the reputation acquired by others in Mr. Van Voorst's series: they are chiefly small views of localities interesting to the British zoologist from their being associated with the labours of those whose names, with him, are as household words.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

June 25, 1861.—Dr. J. E. Gray, F.R.S., V.P., in the Chair.

The following extract was read from a letter, dated Sydney, April 19th, addressed by Dr. G. Bennett, F.Z.S., to the Secretary:—

“You will recollect I mentioned in my ‘Gatherings’ a specimen of the Semipalmated Goose (*Anseranas melanoleuca*). That bird I found on my return to Sydney alive and well; and it has been presented to me by its owner, Mr. Clarke. In the young bird the legs and mandibles were flesh-colour; in the adult they are of a light reddish-orange colour, except the horny tip of the mandibles, which was of a light-blue colour. The black and white plumage—the former colour predominating—imparts to the bird a very handsome appearance as it walks with a stately tread (not with the waddling gait of the goose) about the yard of my house like one of the Waders. I have, however, from ignorance of its natural habits been the pro-

bable cause of the death of this bird, and I send you the following remarks, considering they may be of some service to those desirous of domesticating them. This bird was reared from the egg hatched under a common hen, and has survived nearly four years and a half domesticated in daily amicable intercourse with ducks, geese, and all kinds of poultry, and always appearing playful and happy in their society. But it unfortunately happened that, when sent to me, I was not aware of its aversion to a solitary life. When alone in the yard I noticed that it did not eat. Fearing that it had not its usual food, I made inquiry, but found that it had its accustomed food. Still, however, it moped, and more frequently than usual made its peculiar clanging noise; and although it would walk about the yard, yet it more frequently mounted the high flight of stone steps and squatted upon the lofty wall, remaining there for the most part of the day. Although it did not feed well, yet it would often wash itself in a tub of water placed for its use, and drank a good deal of water. At last it became ragged in plumage, the wings drooped, and it died after having been in my possession only from the 28th of February to the 25th of March. On mentioning the circumstance to a relation of the donor, I was then informed, but too late, that if kept by itself it would droop and refuse food, but when placed among other fowls became lively, playful, and fed well. I fear that many birds and other animals perish in our menageries by inattention to these apparently trivial circumstances, which are, however, most essential to their successful rearing and preservation. I have been informed, by those who have eaten of these birds in the southern parts of Australia, that they are usually thin, and the flesh coarse and not well-flavoured."

NOTES ON THE BROAD-FRONTED WOMBAT OF SOUTH AUSTRALIA
(*PHASCOLOMYS LATIFRONS*, OWEN). BY GEORGE FRENCH
ANGAS, CORRESPONDING MEMBER OF THE ZOOLOGICAL
SOCIETY OF LONDON, ETC.

The existence of a second species of *Phascolomys* on the Australian continent was established some years ago by Professor Owen, from a skull sent to England from South Australia, and named by him *Phascolomys latifrons* (see 'Proceedings of the Zoological Society' for 1845).

Mr. G. R. Waterhouse, in his excellent work on the *Marsupialia*, says, "Of the Broad-fronted Wombat, all that is known is a skull sent from South Australia to Professor Owen. This skull presents so many marked differences when compared with that of the *Phascolomys Wombat*, that no doubt can be entertained of the existence of two distinct species of Wombats."

I have lately had the opportunity of examining a full-grown male example of the Broad-fronted Wombat, now living in the Botanical Gardens in Adelaide, and of comparing it with two adult specimens (male and female) of the Tasmanian Wombat, which, fortunately enough, were being exhibited at the time in Adelaide. The differ-

ences between the two species were so evident, that I was induced to make a careful drawing of *P. latifrons*, which, together with my observations and measurements of both animals, I have much pleasure in laying before the Society.

When I first saw the Wombat in the Adelaide Gardens I was at once impressed with the idea that it was an animal altogether distinct from that figured by Mr. Gould in his 'Mammals of Australia;' but as I was unable to refer to a copy of that magnificent work in this colony, I hailed with pleasure the arrival of the living Tasmanian Wombats, an inspection of which set aside all my doubts as to the distinctness of the two species.

Phascolomys latifrons, Owen. Adult male. Total length 38 inches. Fur fine and silky, rather long, particularly on the hind-quarters; colour light silvery mouse, tinged with buff and purplish brown, browner on the face; the chest is white; the remainder of the under surface is of a reddish mouse-colour; the feet are of the same colour as the body; the claws are smaller than those of *P. Wombat*; the toes are covered with hair to the nails; under lip blackish; there is a light-coloured spot above the eye, and a corresponding one below it, with a dark triangular patch extending underneath the eyes in front towards the nostrils; eyes small, irides dark hazel; eyelids black; nose flesh-coloured; the bristles of the eyebrows are black and rather long, as are also those in the centre of the cheek and round the nostrils; tail naked and very small; the hind quarters present somewhat of that peculiarly flattened or truncated appearance observable in the ordinary Wombat; the ears are well-clothed with hair internally. The following are the dimensions of *P. latifrons*:—

	in.	lin.
Length from tip of nose to root of tail	37	0
— of tail	1	0
— of head	10	0
— of ear	3	8
Breadth between tips of ears	8	0
— between root of ears	5	0
— between eyes	3	0
Girth of skull in thickest part	18	0
— of centre of body	28	4
Length of hind foot, including claws	4	4
— of fore foot	3	3
Height at shoulder	12	0
— at hips	14	0
Length of hind claw $\frac{1}{2}$ an inch; fore claw . .	1	0

Phascolomys Wombat, Péron et Lesueur. Adult male. Total length 33 inches. Fur very rough and coarse, of a dark grizzly-grey; ears quite small, blackish brown outside, whitish internally; nose nearly black, and more pointed than that of *P. latifrons*, giving to the face an expression slightly resembling the "Koala" (*Phascolarctos cinereus*); whereas the *P. latifrons* presents a bold, bull-dog-like aspect from the greater expansion of his face and width of

nostrils ; the tail is naked and rudimentary ; the feet are black, as are the hairs of the fur covering them above ; the claws are black, and are longer and more powerful than those of *P. latifrons*. The general aspect of *P. Wombat* is more bear-like than that of *P. latifrons*. In standing it arches its back considerably, and does not hold its head so erect as the latter animal ; the expression of the eye, too, is decidedly fierce, and lacks the good-natured twinkle of the South Australian species. Next to the form of the skull, one of the most striking specific differences manifests itself in the colour, character, and texture of the fur ; in sleeping it rolls itself almost into a ball, burying its nose between its fore paws. The measurements I made of the adult male of the *P. Wombat* are as follows :—

	in.	lin.
Extreme length	33	0
Length of head	9	0
Breadth between tips of ears	6	9
Breadth between eyes	3	0
Length of ears	2	0
Girth round centre of body	29	6
Height, middle of back	15	0

The specimen of *P. latifrons* in the Adelaide Botanical Gardens is the only one I have yet seen. It was caught some twelve months since, near the Gawler River, about thirty miles north of Adelaide. It is kept in an enclosure, where it is secured with a strong chain and collar to prevent its escape by burrowing ; it is perfectly docile, and never attempts to bite like the Common Wombat ; it is fed artificially on bran and weeds, and drinks freely of water. The only sound it emits is a short quick grunt when annoyed ; it sleeps a good deal during the day, and appears impatient of heat and rain, as in its wild state it is entirely a burrowing animal, living in large holes in the limestone districts, and only leaving its habitation towards dusk for the purpose of obtaining food. The specimen in the Gardens is fond of lying on its back like a bear, the feet are thoroughly plantigrade, and on the inner hind toe the claw is quite rudimentary. He will burrow 3 or 4 feet into the soft ground of his enclosure, and scratches alternately with his fore paws. When worried he will turn his hind quarters to the enemy, and, suddenly turning round, make a charge at his legs, evidently for the purpose of throwing him down ; otherwise he is perfectly harmless. He runs fast for a short distance in a sort of gallop, but soon tires, and is easily caught. Although in some parts of the colony, especially on Yorke's Peninsula and about Port Lincoln, the holes of these Wombats are very numerous, yet the animals are but rarely seen. Many of the oldest colonists have informed me that they never saw a Wombat alive. The blacks on the Murray describe two kinds of Wombats ; one (evidently *P. latifrons*) they speak of as "big yellow fellow," the other as being smaller and dark ; they also say that the impressions of their feet in the sand-tracks leading to their burrows bear a striking resemblance to those of the foot-prints of a young child. The flesh

they describe as being like pork, and excellent eating. They are extremely difficult to obtain on account of their great timidity. The usual plan is to make a screen of boughs in the vicinity of their haunts, behind which the natives conceal themselves; and then, if not killed on the spot, they will scramble to their holes, from whence it is utterly impossible to dislodge them.

Collingrove, South Australia,
April 1861.

LIST OF SPECIES COMPOSING THE FAMILY MEGAPODIIDÆ;
WITH DESCRIPTIONS OF NEW SPECIES, AND SOME ACCOUNT
OF THE HABITS OF THE SPECIES. BY GEORGE ROBERT
GRAY, F.L.S., ETC.

1. TALEGALLUS CUVIERI, Less. Voy. Coq. i. p. 716.

Talegalla Cuvieri, Pr. B. Compt. Rend. 1856, t. 38. p. 876.

New Guinea (Havre Dorey); Aru Islands.

2. TALEGALLUS LATHAMI.

New Holland Vulture, Lath. Hist. of B. i. p. 32.

Alectura —, Lath. Hist. of B. x. p. 455.

Alectura Lathamii, Gray, Zool. Misc. i. p. 3.

Meleagris Lindsayi, James, Mem. Wern. Soc. vii. p. 473.

Catheturus australis, Swains. Classif. of B. ii. p. 206.

Catheturus Cuvieri (Less.), Bl.

Talegalla Lathamii, Gould, B. of Austr. v. pl. 77.

Catheturus Novæ Hollandiæ (Lath.), Pr. B. Compt. Rend. 1856,
p. 376.

Brush Turkey.

‘Wee-lah’ of the natives.

Australia.

3. MEGACEPHALON RUBRIPES, G. R. Gray & Mitch. Gen. of B.
iii. pl. 123 (adult).

Megacephalon Maleo, Temm.; Wallace, Ibis, 1860, p. 142.

Megapodius rubripes, Quoy & Gaim. Voy. Astrol. t. 25 (young).

Celebes (Menado).

4. LEIPOA OCELLATA, Gould, Proc. Z. S. 1840, p. 126; B. of
Austr. v. pl. 78.

‘Marrakko,’ ‘Marra-ko,’ of the natives of S. Australia.

‘Ngow-o,’ ‘Ngow,’ of the natives of W. Australia.

5. MEGAPODIUS FREYCINETI, Quoy & Gaim. Voy. Uranie, t. 32.

Juv. *Alethelia Urvilii*, Less. Voy. Coq. i. p. 703, t. 37; Pr. B.
Compt. Rend. 1856, p. 876.

Island of Waigiou; Guébé, Boni; Batchian? and Kaisa Islands?

6. MEGAPODIUS QUOYII.

Megapodius Freycineti, p., G. R. Gray, Proc. Z. S. 1860, p. 362.

Like the Batchian examples of the former species; but it is of a

more slaty fuscous-black, especially on the head, neck, and breast ; quills fuscous black ; tarsi apparently of a pale horn-colour.

The young differs from that of the former species in being also more of a slaty black on the head, neck, and breast, and the plumes of the wings sooty black, rather narrowly margined and banded with ochre. These marks are decidedly more prominent in this species than in the young of the last ; cheeks and throat ochraceous white ; the buff spot on the abdomen appears to be, when first hatched, buffy white.

Gilolo (South).

7. *MEGAPODIUS FORSTENI*, Temm. ; G. R. Gray & Mitch. Gen. of B. iii. pl. 124.

Megapodius Freycineti, p., Temm.

Top of the head, wings, and back olivaceous-brown, tinged with obscure rufous ; front, sides of the head, neck, breast, and nape slaty fuscous ; abdomen fuscous, slightly tinged with slate-colour. Bill pale horn-colour ; feet plumbeous black.

Length 13", wings 8" 3", tarsi 2" 7".

Amboina ; Ceram ; Banda ?

8. *MEGAPODIUS MACGILLIVRAYI*.

Top and sides of the head, back, wings, tail, sides of the abdomen, and under tail-coverts deep olivaceous fuscous, tinged with obscure rufous ; neck, nape, some of the lesser wing-coverts, and beneath the body slaty black. Bill dark horn-colour ; feet pale (red) ; claws black.

Length 13" 6", wings 9", tarsi 2" 2".

Louisiade Archipelago (Duchateau Isles and Pig Island).

9. *MEGAPODIUS LA PEROUSI*, Quoy & Gaim. Voy. Uranie, t. 33.

'Passegniat' of the natives.

Ladrone or Marian Islands (Tinian, Guam, and Rotta).

10. *MEGAPODIUS GILBERTII*.

Megapodius rubripes, p., Wagl. Isis, 1829, p. 737 ?

"*Megapodius of small size*," Wall. Ibis, 1860, p. 142.

Top of the head, nape, neck, and wings olivaceous brown, tinged in part with obscure rufous ; front, sides of the head, collar round the neck, and beneath the body slate-colour. Bill fuscous horn-colour ; feet plumbeous black.

Length 12" 3", wings 8", tarsi 2" 2".

Celebes.

11. *MEGAPODIUS CUMINGII*, Dillw. Proc. Z. S. 1851, p. 118, pl. 39.

Philippine Islands (Manilla) ; Labuan ; Borneo (North-western) ?

12. *MEGAPODIUS GOULDII*.

Top of the head greyish-olivaceous brown ; back, wings, sides of

the abdomen, and beneath the tail rufous-olivaceous brown; sides of the head, neck, nape, and beneath the body slate-colour. Bill pale horn-colour; tarsi pale red; toes blackish, claws black.

Length 11" 6"', wings 8" 3"', tarsi 1" 11"'.
Lombock.

13. MEGAPODIUS NICOBARIENSIS, Bl. Journ. A. S. B. xv. pp. 52, 372.

Nicobar Islands.

14. MEGAPODIUS REINWARDTII, Wagl. Syst. Av. Megap. Addit. sp. 4.

Megapodius Duperreyii, Less. Bull. Univ. des Sci. no. 5. p. 113; Voy. Coq. t. 36.

Megapodius rubripes, Temm. Pl. Col. 411; Wagl. Isis, 1829, p. 737; Less. Tr. d'Orn. p. 479.

'Mangoipe' of the Papuans.

New Guinea (Havre Dorey, River Oetanata); Amboina?; Aru and Ké Islands.

15. MEGAPODIUS TUMULUS, Gould, Proc. Z. S. 1842, p. 20; B. of Austr. v. pl. 79.

'Ooregoorga' of the natives.

Australia (North); Islands in Endeavour and Torres' Straits.

16. MEGAPODIUS WALLACEI, G. R. Gray, Proc. Z. S. 1860, p. 362, pl. 171.

East Gilolo.

17. MEGAPODIUS STAIRI.

Megapodius — ? G. R. Gray, List of B. of the Trop. Isl. B.M. p. 46.

Egg dusky white. Length 3" 1"', width 1" 1"'.
Samoan or Navigator's Islands (*Rev. J. B. Stair*, 1847).

18. MEGAPODIUS BURNABYI.

Megapodius — ? G. R. Gray, List of B. of the Trop. Isl. B. M. p. 46.

Egg pinkish stone colour. Length 3" 1"', width 1" 9"'.
Hapace Islands (*Lieut. Burnaby, R.N.*).

These two latter species are only known by a specimen of the egg from each locality having been presented to the British Museum. I have here provisionally placed a specific name for each; having little doubt that they will prove distinct species from each other, and even from all the other known species.

19. ? MEGAPODIUS ? ANDERSONI.

Tetrao australis, Anders. MSS.

"*Fusco nigroque; pedibus nudis.*"

New Caledonia.

The name given above (with the very short specific characters) was found among others in the manuscripts of Anderson, who was assistant-surgeon during the third voyage of the famous circumnavigator Cook. Though the description is so short and concise, I am, however, induced to suppose that it can only be referred to a species of *Megapodius*; certainly it cannot be reconciled with any of the present known birds from New Caledonia. I refer to it in the hope that this slight indication may lead to its being searched for by collectors and others who may be located in that island, thus proving whether I am right in my supposition with regard to its being one of this remarkable genus.

The family of *Megapodiidae* is composed of a series of birds which are very remarkable for the extraordinary and anomalous contrivances resorted to by the different species for obtaining the artificial heat that is necessary for bringing their eggs to maturity; and for other singularities in their general habits, &c. The account which follows is principally collected together into one view from different published sources.

These birds are all, with one solitary exception, as far as is at present known, inhabitants of certain localities within the tropics, viz.:—

Nicobar Islands, Lombeck, Borneo (N.W.), Labuan, and Luçon. Celebes, Gilolo, Batchian, Ceram, Amboina, Banda Islands, Guébé, Boni, and Waigiou Islands.

New Guinea, Louisiade Archipelago, Aru and Ké Islands.

Australia (North, West, and South), Islands in Endeavour and Torres' Straits.

Ladrone or Marian Islands. They are also known to exist in Hapae or Habai Islands, Samoan or Navigator's Islands; and probably in New Caledonia.

They generally inhabit the dense forests, brushes, and mangrove swamps, or jungles of luxuriant vegetation, especially those that border the sea-beach, or rivers and creeks; but others (*Leipoa ocellata*) prefer the sandy districts of the scrub.

Their appearance when walking in open places is stately and somewhat sedate; which may be occasioned by their habit of lifting their feet very high, and of setting their backs up, somewhat like the guinea-fowls. Their extreme shyness and timidity causes them to reside in, or to remain in close approximation to, the thickets, &c., that they may escape, if disturbed, by running (which they do with great quickness) among the vegetation; but should they fail thus to conceal themselves, they then fly on to the lower branches of the trees, where they remain quite motionless, with the neck sometimes stretched out in a line with the body, or they ascend to the top of the tree by leaping from branch to branch; and should they still be alarmed they will fly off with a heavy flight for a short distance to some other more secure position, where they can only be approached by carefully proceeding under cover of the large trees. It has, however, been remarked that some species have never been seen to perch.

They are often heard uttering at intervals a loud clucking or

screeching noise, while they lie concealed beneath the shady branches of the trees during the midday heat. Some have been observed to dust themselves on the sandy ground after the manner of gallinaeous birds; and they have been noticed to be apparently very pugnacious at times, swiftly chasing each other along the ground, and calling to one another more loudly than usual, suddenly stopping, and then again running off in pursuit.

Their food is entirely sought for on the ground; it is obtained by scratching among and turning up the fallen débris beneath the trees and shrubs in the forests, &c., and consists of seeds, fallen fruits, insects, and small snails: but one species is thought to feed chiefly on fallen fruits resembling the cotyledons of leguminous seeds; and rice is also said to form a portion of its food.

The species that form mounds for the purpose of incubation, usually select during the tropical spring a retired and shady place in the dense thickets or brush, occasionally surrounding the trunk of a tree by a portion of the materials employed in its formation, should it come within the prescribed limit of the mound.

The mound is composed more or less of vegetable matter, which becomes decayed and rotten during the period that the birds are engaged in laying their eggs, which is thought to be an occupation of two or three months' duration. The size of the mounds varies with the species; some have been found reaching to 14 feet in height (24 feet from the base of the slope to the summit) and 150 feet in circumference, and some are even larger. The materials required in their construction are collected by the birds by means of their large feet, either by carrying a small quantity at a time in one foot, or by scratching it together with their lengthened claws, and thus leaving the earth bare for some distance round the mound. The mound of some species (*Talegallus*) is entirely composed of vegetable matter; others (*Leipoa ocellata*, *Megapodius Macgillivrayi*, *Megapodius tumulus*), however, mix with the vegetable matter earth, sand, gravel, stones, and even, in some cases, fragments of corals; in fact, the birds employ whatever falls in their way at the locality they have selected. The same pair frequent the mound year after year, destroying that of the former year on the renewal of the season for laying; thus the vegetable portion of the centre becomes mixed with the sand and earth that formed the outer part of the former mound. The pair, on renewing the mound, first collect a new mass of vegetable débris for the centre, on which is scratched some of the former material to a certain height, leaving the centre somewhat hollow. It is in the middle, at various depths, from 18 inches to several feet, according to the habits of the different species, that the females of some species deposit their eggs, in the form of a circle (*Talegallus*, *Leipoa*), while others place them in an irregular manner in separate excavations in different parts of the mound. The eggs are deposited at about sunrise, one by one, at an interval of days between each, reopening the centre on each egg being placed therein, and then covering it again, and returning each time to their usual haunts in the thickets, &c., until all the eggs intended to be laid are

deposited. The centre is then completely covered in, and the mound becomes elevated to the height of several feet with the remaining earth or vegetable matter, assuming a conical or dome-shaped form ; but the large mound has the top flattened for about 3 feet in diameter. The heat that is engendered by the fermentation of the vegetable matter is thus retained within the mass, and causes the eggs to arrive at the period of maturity.

It is thought that the bird allows the centre to be but slightly covered during the period of laying—for two reasons : first, that it may have the less to scratch away on each visit, and thus be enabled more easily to deposit the egg ; secondly, that the eggs already laid may be kept in a cool and certain temperature until all are deposited ; while, at the same time, the rain may more readily penetrate through to the vegetable mass, which would hasten the rotting, and thereby raise the necessary heat for the hatching against it is really required.

The mode adopted by the Megapode of Banda (*Megapodius amboinensis*?) differs materially from that of the species above referred to. It is stated that the eggs of this bird “occur isolated and dispersed here and there ; but each egg was carefully covered by a mass of fragments of dry plants or leaves.”

Another remarkable difference is exhibited in the habits of the small Celebian Megapode (*Megapodius Gilbertii*). This species is observed “to scratch out a hole in the rotten stump or root of a fallen tree, and there bury its eggs ;” but nothing is said about covering them with vegetable debris or other matters, which we may, however, suppose them to do, as is exemplified by the other species of this singular family.

There are other species whose habits are still more extraordinary in the selection of places for the incubation of their eggs.

One species (*Megacephalon*), which resides many miles away in the inland forests, and others (*Megapodius Freycineti*, *M. Cumingii*, *M. nicobariensis*) that live in the jungles not far removed from the beach, seek daily in pairs (often thus congregating in flocks of hundreds at the period of laying their eggs) the sea-beaches, where, in a retired position in the masses of sand thrown up above high-water mark, as well as near the neighbouring jungles, may be observed a number of holes of various diameter scratched in the sand : so rapidly do the birds throw up the sand, that it looks completely like a fountain during the operation. The holes are usually of the depth of 18 inches to 2 feet ; in them, it is thought that “a number of hens” deposit in succession their eggs, upright in the sand on the side of the same hole at a distance of a few inches between each. The number of eggs has been found to vary in the different holes, which may, in some measure, depend on the number of females that visit each. Each egg of the same female must, however, be, as in the former case, laid at an interval of some days ; but whether they return to, and lay their eggs in, a hole already formed by a single pair or by several pairs in company on the same day, is not quite determined. Each separate female must, after the hole is made, when about to lay, scratch a place for the egg on the side within the hole,

and when deposited must cover it with some portion of the sand which is around it, and thus by degrees the interior of the hole becomes mostly filled in, after which the place of concealment is often betrayed by the birds scratching over it a large heap of such shells and rubbish as they may meet with on the beach. The eggs are then left to be hatched by the heat engendered in the sand through the rays of the tropical sun playing on its surface; probably a longer period for hatching the eggs is required than from the heat caused by the fermentation of decaying vegetable matter, the heat of which is known to be considerable.

Thus, if the preceding statement is correct, the eggs in one hole have been laid and the hatching of them has commenced about the same time; and therefore it may be concluded that, after the necessary time has elapsed, all the young birds are likely to make their appearance about the same period.

It has been previously stated in reference to some of the mound-raising species (*Talegallus*, *Leipoa*) that the eggs are placed by the bird in a circle. The mode thus adopted by the bird is interestingly accounted for by His Excellency Sir George Grey, in the following manner:—After the bird, he says, has deposited the first egg in the sand, leaving from 4 to 6 inches between the lower end of the egg and the layer of dead leaves, it then lays the second egg, which is “deposited in precisely the same plane as the first, but at the opposite side of the hole before alluded to. When the third egg is laid it is placed in the same plane as the others, but, as it were, at the third corner of a square. When the fourth egg is laid it is still placed in the same plane, but in the fourth corner of the square, or rather of the lozenge, the figure being in this form . The next four eggs in succession are each placed in the interstices, but always in the same plane; so that at last there is a circle of eight eggs all standing upright in the sand with several inches of sand intervening between each.”

Other species do not regard such mathematical principles in the laying of their eggs, but place them irregularly anywhere within the mound, or in whatever position the several species may instinctively adopt, as previously explained. That they may obtain the heat required to bring them to maturity appears to be the principal object.

It seems marvellous that these birds, after they have taken all these precautions for the preservation and development of their eggs, should exhibit no further care for them, but leave the young entirely to find for themselves their way out of whatever position the females may have placed the eggs in. The young bird, on breaking the shell, scratches its way out of the heap without any assistance, and when free, just shakes off the material of which the heap had been composed, and then runs off to the thickets, &c., and commences seeking its food without any hesitation, by scratching and turning up the earth or débris that lie on it, like an old bird. Each bird is fully fledged on its first appearance. This latter circumstance has caused some collectors and ornithologists to suppose these young birds to be the adult state of a species; and the idea has occasioned

the establishment of the generic appellation of *ALECTHELIA*, with the specific name of *Urvilii*, Less. This name has been attached to all the specimens of young birds sent from various localities, though in colour and markings they differ from each other, but retain somewhat of the colour of the parents. Thus, *M. Freycineti* and *M. Quoyi* are of a sooty-black colour, with the cheeks and throat of a pale ochraceous colour; but the markings differ in each species: the former has the wing-coverts margined, and all the quills banded, with pale ochre-colour; in the latter, however, it is only irregularly banded on the tertials and lower part of the back. On the other hand, the young of *M. Reinwardtii* and *M. tumulus* are of a rufous colour; the former has the back of the neck and nape greyish-brown, throat ochraceous white, breast and beneath the body greyish ochraceous with a buff spot on the abdomen, quills fuscous, wing-coverts and tertials margined with deep rufous, feet pale. The latter species is very similar, but appears to be more decidedly margined on the wing-coverts and tertials with pale rufous, conveying the appearance of bands; throat rufous ochre; and beneath the body of a somewhat darker colour than in the previous example. These differences between the young and adult birds are so strongly marked, that even Mr. Wallace states, with regard to one sent home by him, that "he is convinced it is an adult bird," "as it is considered to be by the natives of Aru."

The egg is remarkably large when on the point of being laid (measuring from $3\frac{1}{2}$ to $4\frac{1}{4}$ inches in length, and 2 to $2\frac{1}{2}$ inches in width, weighing 8 or 9 ounces); it consequently fills up, says Mr. Wallace, the lower cavity of the body, squeezing the intestines so that it seemed impossible for anything to pass through them; while the ovary contained from eight or ten eggs about the size of small peas, which must evidently require somewhere about the time named (thirteen days the natives assert) for their successive development. A considerable interval, says Mr. Wallace, "must elapse before the succeeding one can be matured. The number of eggs which a bird produces each season seems to be about eight;" so that, if this supposition is correct, "an interval of three months must pass between the laying of the first and last egg."

The eggs vary from white to cream- or pale salmon-colour. Some eggs are often covered with an epidermis of a dirty-brown colour, which easily chips off, exposing the proper colour of the egg.

The birds place the egg upright in their mounds or other places, so that the egg may obtain the heat equally on all sides,—as other birds, which sit on their eggs, continually turn them so that each side may equally obtain the same amount of heat from their bodies, which is essentially requisite, or the egg would not be brought to perfect maturity.

The eggs, it is said, "when quite fresh are delicious eating, as delicate as a fowl's egg, but much richer." The natives of the Hapace Islands, either from their rarity or from their great delicacy, look upon the eggs found in their islands as worthy to be reserved for the chief's eating; and for that reason they are denominated "Chief's

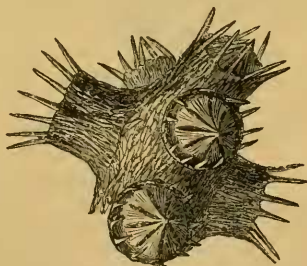
Eggs." The flesh of the adult bird of some species has been pronounced to be good eating.

DESCRIPTION OF A SECOND SPECIES OF ACANTHOGORGIA (J. E. GRAY) FROM MADEIRA. BY JAMES YATE JOHNSON.

In the 'Proceedings of the Zoological Society' for 1857, p. 128, was printed a description of a new genus of *Gorgoniadæ* by Dr. J. E. Gray, founded on a specimen in the British Museum, the habitat of which was unknown. The genus was named by its describer *Acanthogorgia*, and the specimen was figured, by an inadvertence, in the 'Proceedings of the Zoological Society' for 1851 (*Radiata*, Pl. III. fig. 2), under the name of *Nidalia occidentalis*, instead of *Acanthogorgia hirsuta*, Gray. I am now in a position to state that the native place of this curious Black Coral (of which no notice has been taken by M. Milne-Edwards in his work on Coralliaria) is Madeira; for I possess one specimen, and have seen others, obtained from deep water near that island. Last winter a specimen of Black Coral fell into my hands (also obtained from the same coast), which, though evidently belonging to the genus *Acanthogorgia*, appeared on examination to be specifically distinct from the species previously described. I now proceed to lay before the Society a description of this second species, which I have named, in honour of the founder of the genus to which it belongs,

ACANTHOGORGIA GRAYI.

Colour dark brown. Branching irregularly, with a tendency to grow in one plane. Branches free, slender, flexible, having an average diameter of one-seventh of an inch; the thickest part of the stem near the base has a diameter of three-tenths of an inch; the ends of the branches are rounded, and thicker by one-half than the neighbouring portion of the branch. Axis pale brown, very slender, that of the smaller branches, when dry, being not more than the twentieth



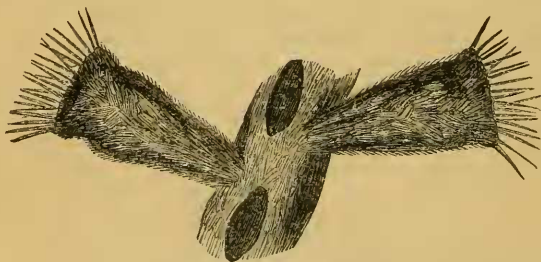
Acanthogorgia Grayi.

of an inch in diameter. When the coral has been a few days out of the water, the axis shrinks from the bark, and remains distinct in the

middle. It is composed of fibrous matter without spicula. Caustic alkali has little or no effect upon it, even on the application of heat. Bark composed almost entirely of spicula, studded with sessile cylindrical cells, irregularly distributed on all sides. These cells have a height of from the thirtieth to the twentieth of an inch, and their diameter is about half the height. The upper halves of eight (sometimes nine) large erect spicula project round the orifice of each cell at eight angles, corresponding with the same number of slightly elevated ribs or crests on the outside of the cell formed by other spicula; the exposed portion of these projecting oral spicula is smooth. In *A. hirsuta* the exposed portions of the corresponding spicula are rough. The orifice itself in a dry specimen is covered in by another series of large spicula, sixteen in number, arranged in eight pairs, the apices of which meet in the middle. At the outside of the cells the spicula are placed parallel, not crossed as in *A. hirsuta*.

The spicula are composed of calcareous matter, and are at once dissolved with effervescence on the application of a strong acid, leaving behind a formless mass of brown animal matter. The spicula which lie in the bark between the cells are fusiform, slightly bent, and for the most part very stout, some elongated, others contracted to an ovoid form; those which project round the orifices of the cells have their basal portion geniculate, flattened, and very rough, with protuberances; and not unfrequently the bases are branched. The spicula of both species are pretty objects under an object-glass of low power.

Acanthogorgia Grayi differs from *A. hirsuta* (of which a figure is here given for comparison) in the much smaller size and in the form of



Acanthogorgia hirsuta.

the cells, which are cylindrical, not bell-shaped or contracted at the bottom. In the only specimen of the former which I have seen, the cells are not nearly so numerous as in the specimens of the latter which have come under my notice. Moreover, the orifices of the cells in *A. hirsuta* are not roofed in with spicula in the same complete and regular way as is the case with the cell-orifices of this species. Lastly, I have not noticed any branching at the bases of the large spicula of *A. hirsuta*.

The only specimen of this very curious Black Coral which has

fallen in my way, and which I have had the honour of presenting to the British Museum, was brought to me when residing at Funchal in the month of February last. It was said to have become entangled in a fishing line, and to have been brought up from a considerable depth near Ponta do Pargo, the south-west extremity of the island. It was attached to a stone on which a small specimen of *Dendrophyllea ramea*, a not uncommon Madeiran coral, was seated. It has a height of 6 or 7 inches, and it measures about 10 inches across.

MISCELLANEOUS.

Investigations of the living Brachiopoda of the Mediterranean.

First Memoir: on *Thecidium*. By M. LACAZE DUTHIERS.

THE *Thecidia*, fixed by the convex face of the concave valve, only move the dorsal or apophysary valve. Four muscles serve to lower the latter and close the shell. There are two to open it; they form the innermost pair. The separation of the valves is active, and the abductor muscles act as the power of a lever of the first order.

The arms would resemble in many respects those of other Brachiopoda, if they were not adherent to the mantle all along their basal ridge. D'Orbigny's expression of *abrachiopodes*, applied to the *Thecidia* is entirely false: indeed, what is a Brachiopod without arms?

The cirri present two very distinct structures:—a cortical layer, which is soft and easily destructible—the cellular envelope; and a hard, resistant, and nearly cartilaginous axis, which is the framework. They differ a little in the two sexes; these differences will come into consideration in connexion with the reproduction.

The mouth occupies precisely the same situation as in the other Brachiopods. In all, in fact, the arms are united by the arc of a circle—a true, more or less concave horseshoe, which they form by becoming confounded on the median line; and it is at the bottom of this curve at the middle that we see the buccal orifice, always in front of the ridge, the base of the arms, and the insertion of the cirri. The stomach is surrounded by the two packets of cæca which constitute the liver. The intestine presents a very curious peculiarity, already indicated by MM. Hancock and Huxley in the *Terebratulæ*. It terminates in a delicate ligament, and presents no anus. Examination by the lens, and even under high powers of the microscope, left no doubt upon this point.

Behind the mouth, above the arc formed by the base of the arms, there is a nervous centre composed of ganglia, from which issue numerous nerves passing to the two lobes of the mantle and other parts of the body.

The sexes are separate. The testes and the ovaries only exist in one lobe of the mantle—that corresponding to the deeper or inferior valve. The two testes, like the two ovaries, are hidden beneath supplementary osseous plates developed in the thickness of the mantle. The spermatozoid is very small, with a very delicate tail and a